EFFECT OF PLYOMETRIC AND FUNCTIONAL TRAINING PROGRAMME ON SPORT-RELATED PHYSICAL FITNESS AND PSYCHO-PHYSICAL EFFICIENCIES OF BASKETBALL PLAYERS

RESEARCH PROPOSAL

SUBMITTED TO THE

SWAMI RAMANANAD TEERTH MARATHWADA UNIVERSITY, NANDED

FOR THE AWARD OF DEGREE

OF

DOCTORE OF PHILOSOPHY

IN

PHYSICAL EDUCATION

BY

SOHAN NAMDEV SONKAMBLE

UNDER SUPERVISION OF

DR. SINKU KUMAR SINGH

SCHOOL OF EDUCATIONAL SCIENCES,

SWAMI RAMANANAD TEERTH MARATHWADA UNIVERSITY , NANDED

YEAR-2024

Chapter I

Introduction

Back ground of the problem

Plyometricss, also known as "jump training" or "plyos", are exercises in which muscles exert maximum force in short intervals of time, with the goal of increasing power (speed-strength). This training focuses on learning to move from a muscle extension to a contraction in a rapid or "explosive" manner, such as in specialized repeated jumping. Plyometricss are primarily used by athletes, especially martial artists, sprinters and high jumpers, to improve performance, and are used in the fitness field to a much lesser degree.

Plyometrics includes explosive powerful training exercises that are trained to activate the quick response and elastic properties of the major muscles in the body. It will be initially made famous by Soviet Olympians in the 1970s, providing the core element in the strength programs of elite sporting athletes worldwide. Sports using plyometricss include basketball, tennis and volleyball as well as the various codes of football.

The term "plyometrics" will be coined by Fred Wilt after watching Soviet athletes prepare for their events in track and field; he felt this will be a key to their success.[6] He began a collaboration with trainer Michael Yessis of Soviet (Russia)to promote plyometricss. Jump technique remains the same regardless of whether it is a true plyometrics exercise or a jump exercise. The hips, knees, and ankles flex when landing and the joints extend on the upward return. The sequence and overlapping in the sequence is basically the same, beginning with the hip extension, followed by knee extension, and ending with the ankle-plantar flexing. The major differences in execution are the depth of the landing and the time of executing the switch from the eccentric to the concentric contraction. Plyometricss have been shown to have benefits for reducing lower extremity injuries in team sports while combined with other neuromuscular training (i.e. strength training, balance training, and stretching). Plyometrics exercises involve an increased risk of injury due to the large force generated during training and performance, and should only be performed by well conditioned individuals under supervision. Good levels of physical strength, flexibility, and proprioception should be achieved before commencement of plyometrics training.

The basketball game is played both for recreational and competitive purposes. It helps in promotion of health, body control, alertness, coordination and team spirit. The game is played both by amateurs and professionals. The five players take positions in the game. There are two forwards, two guards and a centre. These positions are not fixed but at any time during the game, the players can interchange these positions. The game is played on point basis within the stipulated time. A team which scores more points is the winner. A field goal counts for two points and a foul for one point. At the start or the game, the two centers face each other on the opposite sides of the division line of the centre circle. The referee throws the ball higher up than the extended arms of each jumper. The centre tries to top the ball to any of his team-mates. Now the attempt of the team having possession of the ball is to meneovour --- to school the ball in the basket. For the purpose they employ different techniques such as dribbling, throwing, passing, catching, and feigning. In the end it is jumping, rebounding and shooting. The ball remains in possession of the team until it commits a foul or scores a basket. After the offensive team scores a basket it goes in the defensive. The ball is put in play by the other team from any part of the end line under the opponents' basket.

Plymetrics exercise

Plyometrics exercises enable the athlete to overload and train his/her body in a specific position required for a specific competition situation. Today the high level of professional sport focuses on specific training and plyometrics training is a form of overload exercise.

Plyometrics exercises, in conjunction with a weight-training programme, can lead to the execution of specific aspects of exercises (Siff & Verkhoshansky, 1993).
Wilson, Murphy and Giorgi (1996) as well as Bosco (1985) state that plyometrics exercises can increase participants' ability to use elastic energy. Researchers state that plyometrics exercises can change the elasticity of muscles and tendons, to enable them to store bigger quantities of elastic energy during a given stretch-shortening movement. The faster the execution of the plyometrics activity, the more elastic energy gets stored when the muscles and tendons are stretched to produce more power. In this way the delay between the stretch-shortening cycle is minimal causing maximum energy storage. Another advantage of plyometrics exercises is that it includes movements, which cause elastic energy to maximize the stretch-shortening cycle (Blazevich, 2003).

Functional Exercise

Functional training has its origins in rehabilitation. Physical and Occupational therapists and Chiropractors often use this approach to retrain patients with movement disorders. Interventions are designed to incorporate task and context specific practice in areas meaningful to each patient, with an overall goal of functional independence. For example, exercises that mimic what patients did at home or work may be included in treatment in order to help them return to their lives or jobs after an injury or surgery. Thus if a patient's job required repeatedly heavy lifting, rehabilitation would be targeted towards heavy lifting, if the patient will be a parent of young children, it would be targeted towards moderate lifting and endurance, and if the patient will be a marathon runner, training would be targeted towards re-building endurance. However, treatments are designed after careful consideration of the patient's condition, what he or she would like to achieve, and ensuring goals of treatment are realistic and achievable.

STATEMENT OF THE PROBLEM

"Effect of Plyometric and Functional training programme on Sport-related Physical fitness and psycho-physical efficiencies of Basketball players: An interventional study

"

OBJECTIVES OF THE STUDY

The objective of the study will be to determine of the Effect of Plyometric and Functional training programme on Sport-related Physical fitness and psycho-physical efficiencies of Basketball players

Hypothesis

1. There will be significant effects of plyometric training programme on the physical fitness on basketball players.
2. There will be significant effects of Functional training programme on the physical fitness on basketball players.
3. There will be significant effects of plyometric training programme on the skill of basketball players
4. There will be significant effects of Functional training programme on the skill of basketball players

5. There will be significant differences of the effects between plyometric training programme and functional training programme on the physical fitness of basketball players

6. There will be significant differences of the effects between plyometric training programme and functional training programme on the skill of basketball players

Delimitation of the study

1. The study will be delimited to the basketball players only .
2. The study will be delimited to 90 basketball players and divided in to three groups.
3. The geographical area will be delimited to the jurisdiction of SRTM University only.
4. The period of training programme will be delimited to 12 weeks and 4 days per week.

LIMITATIONS OF THE STUDY

There are a number of limitations restricting the generalize ability of this study are as

1) Since the trainees belong to different level of performance hence the prior Experience of the players may be considered as limitation of the study.
2) Since the trainer belonged to different training this may be also considered as Limitation of the problem.
3) There will be no control of research scholar on the diet of the subjects.
4) The effect of weather conditions will be considered as limitations.
5) No motivation techniques will be used during administrating the test.
6) A limitation of this study is that it reflects the findings of some young adults; the data will be collected in selected population, the results may not be generalized to country.
7) The small sample size of each group had a limiting effect on the statistical power that restricted the ability to detect small differences, as well as non-significant changes.
8) The subjects will be not always able to exercise at the same time of the day, due to preparation for mid-year examinations. Sometimes the exercise sessions took place in

the early mornings and at other times in the late afternoons, which had an effect on their motivation for exercise.

Definition and explanation of important technical terms

Plyometric

Plyometric training is a specific exercise regime that is needed to develop muscles that contract maximally in the shortest possible time . Plyometrics training is also defined as quick, powerful movements, which lead to the activation of the stretch-shortening.

Functional exercise

Functional training attempts to adapt or develop exercises which allow individuals to perform the activities of daily life more easily and without injuries.

CHAPTER II

REVIEW OF RELATED LITERATURE

The Following review is selected for the study

Matavulji *et al.* (2001) support the concept that plyometric training, employing drop jumps, could be a powerful tool to improve jumping performance even in high level athletes.

Brown *et al.* (1986) examined the effect of plyometric training on the vertical jump capability of male high school basketball players (N=26). Results showed that the plyometric group imshowed significantly ($p<0.05$) in the vertical jump with arm assistance compared to the control group. Neither group differed significantly ($p>0.05$) in the vertical jump without arm assistance. In the plyometric group, 57% of the vertical jump gain was due to jumping skill improvement, and 43% was due to strength gain. Plyometric training appeared to enhance arm coordination.

Kemp (1998) three different training programmes, including a gymnasium programme, a plyometric and a combined gymnasium and plyometric programme. The results of this study showed that the combined programme would have a positive effect on the biomotor abilities of the netball players.

Diallo *et al.* (2001) investigated the effectiveness of plyometric training and maintenance training regarding physical performance of prepubescent soccer players. They maintained that stretch-shortening cycle exercises (plyometric exercises) were often used to improve leg muscle power and vertical jump performance in adults but limited information is available regarding the effect of such exercises on children.

Cossor, Blanksby and Elliot (1999) examined the effects of a plyometric training programme on freestyle tumble turns. It is concluded that equal benefits were derived from normal practice time in water or land-based plyometric exercises.

Ebben et al, (2010). evaluated the plyometric training is effective for women, and performance is not influenced by the length of post training recovery - effectiveness of a periodized plyometric training program no significant difference was for jump height or peak power from pre- to post test for the control group.

Solanikidis et al, (2008). was to determine the effectives of plyometric, tennis drills and combined on reaction lateral and linear speed, power and strength in novice tennis players. There was a significant difference in lateral speed (side-steps) between the 2 sides PT improved fitness characteristics that rely more on reactive strength and powerful push-off of legs such as, lateral reaction time, 4-m lateral and forward sprints, drop jump and maximal force.

Kotzamanidis, C., (2006). investigated the effect of plyometric training on running velocity (RV) and squat jump (SJ) in prepubescent boys. results indicate that plyometric exercise can improve SJ and RV in pre pubertal boys' .more specifically; this program selectively influenced the maximum velocity phase, but not the acceleration phase.

Toumi H, Best et al, (2004). was to compare the effects of plyometric training on jump performance. The results of this study show that when plyometric training performed with rapid stretch contraction, the CMJ jump height increase and the TR decrease.

Turner, Owings and Schwane, (2003). Found the plyometric training improved economy. Plyometric training did not result in changes in jump height (or) efficiency variables that would have indicated improved ability to store and return elastic energy

Swanik et al, (2002). Found plyometric activities may facilitate neural adaptations that enhance proprioception, kinesthesia and muscle performance characteristics. Significant neuromuscular benefits may be attained if they are implemented earlier into shoulder rehabilitation programs.

Chatzinikolaou A, et al., (2010). Results clearly indicate the need of sufficient recovery between successive plyometric exercises training sessions. Improving repeated sprint ability in young elite soccer players.

Khlifa, R, Aouadi, et al, (2010). investigated was to examine the effect of a standard plyometric training protocol with or without added load in improving vertical jumping ability

in male basketball players. plyometric training program may result in greater vertical and horizontal-jump performances in basketball players.

Santos EJ, Janeira MA., et al, (2010). conducted on the Effects of Plyometric Training plyometric training showed positive effects on upper- and lower-body explosive strength in adolescent male basketball players. These results highlight the unique power that basketball-specific training seems to have on the sustainability and maintenance of sport performance

Izquierdo *et al.(***2008)** Forty-two students were randomly assigned to 1 of 4 groups No significant differences were observed among the groups in pertaining in any of the variables tested. No significant changes were observed in the control group in any of the variables tested at any point.

Diallo *et al.* **(2001)** conducted a study on the effects of plyometric training on physical performance in soccer players**.** no significant performance increase was obtained in the CG. After the 8-week of reduced training, except Pmax ($p<0.05$) for CG, any increase was observed in both groups.

Meylan *et al.* **(2009)** investigated the effects of in-season plyometric training within soccer practice on explosive actions of young players. No significant changes in explosive actions after the 8-week period were recorded for the CG.

Ronnestad *et al.* **(2008)** compared the short-term effects of strength and plyometric training on sprint and jump performance in professional soccer players. The results suggest that there are no significant performance-enhancing effects of combining strength and plyometric training in professional soccer players.

Thomas *et al.* **(2009)** compared two plyometrics training techniques on power and agility in youth soccer players. Post training, both groups experienced improvements in vertical jump height and agility time and no changes in sprint performance. There were no differences between the treatment groups.

Chelly *et al. (***2010)** investigated the plyometric training program on leg power, jump- and sprint performance of soccer players. plyometric training of junior soccer players (including adapted hurdle and depth jumps) improved important components of athletic performance.

Gabbett *et al.* **(2008)** found the improvements in speed, muscular power, maximal aerobic power, and upper-body muscular endurance were greatest in the young junior players, while improvements in lower-body muscular endurance were greatest in the older junior players.

These findings demonstrate that young (i.e., <15 years) and older (i.e., <18 years) junior rugby league players adapt differently to a given training stimulus and that training programs should be modified to accommodate differences in maturational and training age.

Newton *et al.* **(2010)** influence of plyometric training on strength performance.
The responses identified in this analysis are essential and should be considered by the strength and conditioning professional with regard to the most appropriate dose-response trends for PT to optimize strength gains.

Avery *et al.* **(2010)** The PRT group made significantly greater improvements than RT in long jump (10.8 cm vs. 2.2 cm), medicine ball toss and pro agility shuttle run time (-0.23 sec vs. -0.02 sec) following training.

Michael *et al*. **(2006)** assessed the effects of 6-week plyometric training program on agility.
The plyometric training group reduced time on the ground on the posttest compared to the control group. The results of this study show that plyometric training can be an effective training technique to improve an athlete's agility.

Rahim *et al.* **(2005)** examined the effects of plyometric, weight and plyometric-weight training on anaerobic power and muscular strength series. The results showed that all the training treatments elicited significant ($P<0.05$) improvement in all of the tested variables.

Chelly *et al.* **(2009)** investigated the effects of voluntary maximal leg strength training on peak power output, vertical jump performance, and field performances in junior soccer players. specific dynamic constant external resistance exercises are highly recommended as part of an annual training program for junior soccer players.

Matavulj *et al.* **(2001)** examined the effects of plyometric training on jumping performance in junior basketball players. no differences were observed between EG-50 and EG-100. The multiple correlation between four isometric parameters and CMJ revealed

Jovanovic *et al.* **(2008)** Evaluated speed, agility, quickness (SAQ) training method on power performance in soccer players. The results of the 2-way analysis of variance indicated that the EG improved significantly in 5-m and in 10-m sprints, and they also improved their jumping performance in countermovement and continuous jumps (performed with legs extended

Christou *et al.* **(2006)** examined the effects of a progressive resistance training program in addition to soccer training on the physical capacities of male adolescents. Result show that soccer training alone improves more than normal growth maximum strength of the lower limps and agility. The addition of resistance training, however, improves more maximal strength of the upper and the lower body, vertical jump height, and 30-m speed.

Spurrs *et al.* **(2003)** assessed the effects of plyometric training on distance running performance. The results clearly demonstrated that a 6 week plyometric programme led to improvements in 3-km running performance. It is postulated that the increase in MTS resulted improved RE. It is speculated that the improved Re led to Change in 3-Km running performance, as there were no corresponding alterations in vo2 max or Th(la).

Chang *et al.* **(2005)** studied the effect of plyometric training for lower extremities strength and power in high school female basketball players. The players were The results of the study showed that either based on the plyometric training designed and applied to senior high school girl basketball players, CMJ or CJ has its effect.

Miller *et al.* **(2006)** effects of a 6 week plyometric training program on agility. The result revealed a significant group effect for agility measure. A significant group effect was found for the force plate test. The plyometric training group reduced time on the ground on the post-test compared to the control group. The results of this study show that plyometric training can be an effective training technique to improve an athlete's agility.

Frank et.al. (1969) determined the effects of PFT on the BMI and dietary of the college females. The result shown that modifications in BMI occur during physical training program, modification in energy expenditures due to the physical activities was significantly effect by diets also.

Pollack (1971) Studied the Effect of Walking on Body Composition and Cardiovascular Function of Middle Age Men, Body composition showed reduction in total body weight (-13 kg) and percent fat (-1.1 1%).The control group remain constant in most cardiovascular function and body composition measure. Vigorous walking training had significant effect of cardiovascular function and body composition of adult men.

Ben et. al. (1978) Determined the pain threshold heart rate the following two relative workloads were obtained; 55 per cent and 90 per cent of threshold heart rate. Result show that intensive prolonged training may result in improvement of the physiological adaptive mechanism of patients with angina pectoris to continuous physical stress.

Shephard (1997) experimental group receiving 14% less academic instruction, their academic performance significantly increased relative to controls. In the initial months of the intervention, the experimental group experienced accelerated development of various psychomotor skills such as perception, though control students caught up later into the study.

Jarrett et.al. (1998) In this intervention study, suggested that the break-time period serves a positive purpose in the primary school curriculum, contrary to the practice of minimising recess in many schools across North America and the UK.

Stein et.al. (1999) Investigated the exercise training on seven men and nine women. HRV (Heart rate variability) was determined from 24-hour Halter recordings HRV was measured at baseline and 12 months later in the comparison group, Enhanced fitness level had little effect on indexes of HRV. There was insignificant effects in HRV in the above two groups. Exercise training enhanced total HRV in normal adults.

Sallis et.al. (1999) the study was conducted for elementary school children, spending more time in physical education did not have harmful effects on academic achievement when measured using a standardised test. The 2-year follow-up of the physical education program showed pupils in the experimental group did significantly better in achievement tests when compared to controls.

McKenzie et.al. (2004) conducted the study two-year intervention study involving a physical education curriculum change showed a small increase in moderate and vigorous physical activity over control subjects, but no effects on enjoyment of PE or attendance in classes according to follow-up student surveys. However, the authors suggested that in the

particular school used, the baseline levels for enjoyment of PE and attendance were particularly high, leaving little room for improvement.

Bergman et.al. (2005) studied on Health-Related Physical Fitness (HRPF) of students during a year period and also to compare them with HRPF criteria. The results showed that students had high indexes for stature and body weight. Excepted for body composition, the students had low HRPF, presenting high prevalence of below health zone for the physical fitness components.

Adams et.al. (2006) determined the immediate and long-term effectiveness of a university level Conceptually Based Health-Related (CBHR) fitness course on Health-Related Fitness (HRF) knowledge. it was concluded students retain and present, for a minimum of four years, significantly higher levels of HRF knowledge than students that have never taken or completed a university level CBHR fitness course.

Hillman et.al. (2009) examined the impact of 20 minutes of treadmill walking at 60% maximum heart rate, followed by cognitive testing, on 20 preadolescent children. The results showed an improvement in response accuracy and academic achievement on the exercise trial relative to a resting control trial. The findings indicated that there was no increase in arithmetic performance following exercise.

Walk (2009) conducted a study on 2.4 million Texas students in grades 3-12 took part in a series of Fitness gram tests during 2007-2008. One of the outcomes from the data analysis was that, higher physical fitness achievement was associated with better school attendance rate remained true after controlling for potential confounding variables including socio-economic status, ethnicity and school size.

CHAPTER-III

Methodology

This chapter explained the methodological details used to implement the study. Specifically, presented the general perspective and context of the study, an overview of the participants and a description of the procedures used in data collection, and an explanation of data analysis

Demographic Information

The data will be collected through respondents in the form of different tests. The demographic information about, age, height, weight etc. will be obtained before seeking training from Basketball players.

Sampling Method:

Purposive sampling method will be used, as the researcher selected Basketball Players with a specific purpose.

Target of population

Three groups will be targeted, plyometric exercise group and functional exercise group . 30 basketball players selected under plyometric exercise group, 30 basketball players functional exercise group and 30 players of control group. Training will be given to plyometric training and Functional training groups separately.

Research design:

The design in a research study refers to the researcher's overall plan for answering the researcher's question or testing the research hypotheses. This study involves a cross sectional, comparative pre and post-test of two experimental group. Since only two experimental groups will be taken by the investigator and there will a control group so this study will be conducted in a clinical trial experimental design.

Tools of the study:

Stopwatches, still tape, electronic blood pressure device, weighing machine, stadia-meter, Spiro-meter, and health outcome questionnaires tools will be used for data collection.

Plyometrics :

The Plyometric exercise programme will be planned for 4 days a week 30 minutes in a day for 12 weeks including 10 minutes warm up period and 05 minutes cool down. The following plyometric exercise will be taken for basketball players.

1. **Front Box Jump**

The Front Box Jump is one of the most-used plyometrics exercises because it is very effective at increasing one's vertical jump. It strengthens quadriceps and glute muscles, which are essential for jumping.

Procedures of test:

1. Place a plyo box 6 inches in front of you.
2. Get into a squat position with your feet about shoulder-width apart.
3. Squat and explode up using your entire body, including your arms.
4. Land softy on the box on the balls of your feet.
5. Step down, reset yourself and repeat.
6. You can either increase box height or add weight via weighted vest, barbell or dumbbells to increase the difficulty.

Lateral Box Jump

The Lateral Box Jump requires the muscles to contract in a slightly different manner. This is beneficial, because in most cases athletes jump not just forward but also laterally when playing their sports.

Weighted Lateral Jumps

Similar to Lateral Box Jumps, this plyometrics exercise builds lateral leaping ability and strength. It also strengthens the ankles and calf muscles. This movement focuses more on quick feet and agility.

Procedures of test:

1. Place a barbell on the ground with a weighted plate on each side.
2. Adjust the weighted plate size according to your jumping ability—the bigger the weight, the higher the bar.
3. Stand about 6 inches to the side of the barbell.
4. Hold a weighted plate or medicine ball over your head. Adjust the weight according to your ability.
5. Bend your knees slightly with your feet close together.
6. Hop over the bar and back continuously, staying light on your feet.

Broad Jumps

Broad Jumps build true leg strength, because you don't take a first step or get a running start. They require you to perform a deep Squat to propel yourself forward as far as you can, using your quadriceps and glute muscles.

Procedures of test:

1. Use a surface that has some give to it.
2. Get into a squat position with your feet shoulder-width apart facing an open space.
3. Squat down deep and explode up, using your entire body to thrust yourself forward.
4. Land softly on the ground and immediately transition into your next rep.

Skater Jumps

Skater Jumps build lateral strength and power in the quadriceps and glute muscles. They also place the entire load on one leg, which helps with balance and reduces the tendency to favor the stronger leg during two-legged jumps.

Procedures of test:

1. Get into a squat position with your feet close together and the majority of your weight on your right leg.
2. Push off your right leg to the opposite side.
3. Land softly on your left leg and move your right leg behind it like you will be performing a Curtsy Lunge.
4. Repeat on your left leg. That's one rep

Scissor Jumps

This plyometrics exercise is essentially a Jumping Lunge in place. Scissor Jumps increase adductor and glute muscle strength with the legs in a stretched position.

Procedures of test:

1. Get into a standard lunge position, keeping your back straight and your knees and toes forward.
2. Squat down and explode up, switching leg positions in mid-air.
3. Land softly and immediately transition to your next jump.
4. Perform the same movement, switching your leg position each time.

Dot Drill

The Dot Drill increases foot speed and quickness. It also increases ankle and calf strength, like Weighted Lateral Jumps.

Procedures of test:

1. Place a dot mat in front of you or mark five spots like dots on a dice.
2. Start with your feet on the two corner dots at the front end of the mat.
3. Hop slightly off the ground, bringing both your feet together on the middle dot.
4. Without stopping, jump slightly and separate your feet so each foot lands on a corner dot at the far end of the mat.

5. Repeat the movement in reverse. That's one rep.
6. Repeat 10 times.
7. The second sequence is the same as the first, except once you reach the far end of the mat moving forward, turn around and repeat the movement going forward instead of in reverse.
8. Perform that sequence 10 times.
9. The third sequence requires you to hop to each dot on one leg.
10. Start from the dot in the front right corner.
11. On one leg, hop to the middle dot, then the far right dot, then the far left, then hop backwards to the middle dot, then to the front left, and back to the front right. That's one rep. Repeat 10 times.
12. Perform the same sequence on the other foot 10 times, and then 10 times using both feet close together.

Lateral Box Shuffles

These mimic Skater Jumps but they focus more on lateral foot speed and quickness than explosive strength.

Procedures of test:

1. Place a plyo box to the side at about shin height.
2. Stand on the box with your right leg. Keep your left foot on the floor about 6 inches away.
3. Get into a squat position and lift your left foot up onto the box while simultaneously placing your right foot on the floor on the other side of the box.

Barbell Squat Jumps

This exercise adds weight to normal Bodyweight Squat Jumps, making it more difficult. When you perform a normal jump, it seems much easier and you can jump higher by increasing your explosive strength and power. Do not add so much weight that you are unable to perform a good jump.

Procedures of test:

1. Set up a free-weight squat rack, adding weight to the barbell that allows you to perform 10 repetitions.

2. Lift the barbell off the rack and get into a squat position with your feet about shoulder-width apart.
3. Squat down and explode up, jumping off the ground.
4. Land softly and immediately transition into your next rep.

Medicine ball chest pass test

Purpose:

To determine the explosive power and power of the individual's upper body.

Equipment:

Medicine ball (3 kg)

Procedure:

The subject had to sit with legs straight and back against a perpendicular wall. The player then began by holding the 3 kg medicine ball with both hands at chest level, elbows pointing outwards. The ball will be passed forward in a straight line, as hard as possible, in an explosive movement. The distance that the ball will be thrown will be measured from the wall against which the player will be sitting (Tenke & Higgins, 1996).

Scoring:

The distance the individual pushes the 3 kg medicine ball will be used as the score for the chest pass. Each individual got two chances, and the further distance will be recorded.

Therapeutic Exercise:

A functional exercise will be planned for 12 weeks, 4 days a week and 30 minutes a day. Exercise that use large muscles groups that can be maintained continuously and are aerobic in nature. The exercise session should consist of the following procedure:

Warm - up period will be approximately 10 min., this will be combine callisthenic–type stretching, exercise and progressive aerobic activity. However, cool down period will be 5 to 10 min.

<u>Selection of Exercises:</u>

Following exercise will be consider for the study

Squat Jump :

Set your feet in a squatting base, as if you are about to squat with a heavy load, with hands behind your head. Descend into a parallel position and then drive up as high as

possible, making sure to consciously push as hard as you can through your ankles, knees, and hips. Upon landing, attempt to absorb the load of the jump by landing on the front half of your feet and then sinking back onto your heels as the hips descend into the next squat

Bent knee sit ups:

Participants will be laid on back with knees bent, flat on the floor close to the buttocks and Hands on the thigh, then participant exhaled on the way upward and commence curl with the shoulders then the upper back after that participant brought hands to the top of the knees and hold momentarily. In second phase participant lower the torso to the ground and inhaled while returning to the start position. These steps will be repeated.

Squat thrust:

Participant kept their hands on the floor with the arms held straight while the legs are straightened out behind and quickly drawn in towards the body again stand with feet shoulder-width apart and arms at sides. Now participant Pushed hips back, bent knees, and lower his body as deep as you can into a squat. As he squat down, placed hands on the floor in front of him, and then quickly kick his legs backward into a push up position, reverse the movement to return to start. Now these steps will be repeated.

Strudel thrust:

For doing this exercise participant worked over a low secure step box, taken his feet from the side of the step box, jumping up on to the box. Once participant's feet will be together, jump up and out again, taking participant's feet either side of the step box, in order to straddle it, participant avoid lowering on to the step. Used his arms to help and generate an upward lift.

Bench press:

For doing bench press participant started position will be the lying on a bench, with the shoulder blades pinched together to create a stable, solid base for the press, also used in power lifting to reduce the range of motion. Participant kept his feet flat on the ground or at end of the bench, with the buttocks always in contact with the bench. Participants will be arching their back to provide greater stability and to reduce their range of

motion allowing them to move more weight. Different grip widths used to increase or decrease the range of motion and place more or less emphasis on particular muscles. The movement begins by lifting the bar off the uprights and lowering it until the bar is motionless on the chest before being pressed under control to the start position. After the desired number of repetitions, the participant returned the bar to the uprights. Because the load on the bar above the chest can be heavy, a spotting partner increases the safety of the movement.

Pull ups:

Participants will be grasped the overhead bar using either an overhand grip (palms facing away from body) or underhand grip (palms facing toward body), with the arms fully extended. Then participant raised his body until the chin clears the top of the bar, then lowers again to a position with the arms fully extended. As many full pull-ups as possible will be performed.

Depth jump:

In depth jump mainly quadriceps (thigh), hamstrings, gluteus (buttocks), calf Muscles are involved. For doing depth jump ankle extension, knee extension, hip extension these Joint movements are required. Depth jump is applicable to Running and jumping based sports such as tennis, football, basketball and high jump etc. for doing depth jump participants will be stood on top of a strong platform, its height will be 0.5m to 0.8m. Then he stepped slightly forward off of the platform. After that participant will be land toward his forefeet; then reacted as quickly as possible to the ground and jump immediately back up into the air. Participant used his arms to add to speed by drawing them back prior to stepping off the platform and swinging them vigorously upward, as his feet touched the ground. Kept his back in neutral alignment, i.e. not arched or rounded. Repeated this action.

PHYSICAL FITNESS ASSESSMENT

F) Administration of Tests

Pre and Post-tests will be applied on experimental group's to measure physical fitness components.

The following tests will be taken for measuring physical fitness of selected collegiate students from experimental group.

Cardiovascular Endurance:

This component will be evaluated by using 12 minute Run & Walk Test. The 12 minute run test requires the person being tested to run or walk as far as possible in a 12 minute period. The objective of the test is to measure the maximum distance covered by the individual during the 12 minute period and is usually carried out on a running track by placing cones at various distances to enable measuring of the distance. A stopwatch is required for ensuring that the individual runs for the correct amount of time. When time is over, at that time investigator gives signal to stop. Subject will be stands right there where he stops. Then investigator measures the crossed distance by the subject.

Muscular Endurance:

This component will be evaluated by using 1 minute Bent Knee Sit Up test. Abdominal muscular endurance will be measured by performing the 1-minute bent knee sit-up test. Subject Lied on his back with knees bent at a 90-degree angle. His feet will be flat on the floor. Subject interlocked his fingers behind his head, and then slowly rises to sitting position and touched his elbows to knees. Now subject let down his body back to the starting position, and repeated the process as many times as possible for the subject within one minute.

MUSCULAR STRENGTH:

This component will be measured by using Grip Dynamometer & Kraus Weber Strength Test.

Grip Dynamometer Strength Test:

The muscle groups in forearm involve many extensor and flexor muscles. These two groups work together to provide grip strength, which is essential to performing everyday tasks and many sporting activities. The most common way to measure grip strength is with a handheld

dynamometer. A dynamometer is a spring-loaded squeeze device that measures force and assesses muscle group strength. Procedure: The subject used his right hand and applied as much grip pressure as possible on the dynamometer by squeezing the handle together. The maximum reading is recorded by the assistant. The test is repeated three times using the same right hand. The highest recorded value is used to assess the grip strength. Scoring: The highest recorded values for each hand are averaged together to get the total score. This score is then compared on a scale to determine your rating. The ratings are excellent, very good, above average, average, below average, poor and very poor.

Kraus Weber Strength Test:

This test is made up by combining six physical activities or tests. These are as follows: Test No. 1: The subject lied flat on back with his hands behind the neck, assistance held his feet on the ground, and performed one sit-up.

Test No. 2: The subject lied down with his knees will be bent, with his ankles close to the buttocks and performed one sit-up.

Test No. 3: The subject lied flat on back with hands behind neck. Legs straightly lifted 10 inches off the floor. Subject holds his position for 10 seconds.

Test No. 4: The subject lied on stomach with a pillow under his lower abdomen and groin. Assistant holds his feet down. Subject lifted head, shoulders, and chest off the floor and holds for 10 seconds.

Test No. 5: The subject's position will be the same, but the assistant holds the chest down, with straight knees, lift legs off floor and hold for 10 seconds.

Test No. 6: The subject stands erect. Subject keeps knees straight. Bend over slowly and touch the floor with the fingertips. Hold this position for 3 seconds.

Body Composition will be evaluated by using Body Mass Index (BMI).

Body Mass Index is calculated from body mass (M) and height (H). BMI = M / (H x H), where M = body mass in kilograms and H = height in meters. The higher score of the Body Mass Index usually indicates higher levels of body fat.

Flexibility:

This component will be measured by using Bend & Reach and Sit & Reach Test.

Bend & reach Test:

The main aim of this test is to evaluate the flexibility of the subject. For conducting the test a stable wooden box 40 Cm.'s. high on one side is requires. Procedure: Subject stands bare foot on the box with both feet together with toes in line with the edge of the box. From this position he bends forward and downward while keeping his knees straight. He extends his hands along the scale as down as possible. Both the hands should be parallel. At a maximum reach he holds the position for about 2 seconds. Scoring: The result is read from the scale. Two attempts are given at recovery rest of 30 seconds. In case a subject is not able to extend his hands even to the level of the box then the distance from the 0 Cm's. Mark to the tip of middle finger should be measured with a scale and recorded as negative score.

Ethical Consideration:

In this research study the researcher Follow to ethical guidelines, principles, and standards for studies conducted with human beings .The study will be include safeguards for protecting humans,

The inclusion criteria are:

1. The participant will be agreeing to participate in the study.
2. The participants must be competitive young adults in their aged range will be 18 to 35 years.
3. The participants will be not rotating through other health facility at the time of study.

The exclusion criteria are:

1. The participants advised not to participate if under any physiological or psychological disorders.
2. Inability to obtain the questionnaire of the respondent.
3. Presence of chronic medical conditions such as asthma, heart disease or any other condition and

Skill test for basketball

Johnson Basketball Test Battery:

It is probably the oldest but the most commonly used test and will be constructed in 1934 by Johnson during his research work for Master's thesis. This test is a battery of seven test items which includes three items of basic skill and four items of potential basketball ability as described below (i) Field Goal Speed Test (ii) Basketball Throw for accuracy (iii) Basketball Dribble Test

(i) Johnson Field Goal Speed Test:

The tester asks the basketball player (examinee) to stand in any position under the basket and is required to make maximum number of baskets in 30 seconds. The number of successful baskets thrown in 30 seconds provides the score for this test. This item measures the ability of the examinee to make successive field goals as quickly as possible under the stress of time.

(ii) Johnson Basketball Throw for Accuracy (Passing Test):

This test item measures the shoulder strength and the ability of consistent accurate throws. In this test either a rectangular (Clarke and Clarke, 1987) of a circular archery type target (Kirkendall et al., 1987) is placed on a wall. The examinee, standing at a distance of 40 feet from the target, makes ten trails for hitting the ball in the center of the target. For hitting, the examinee uses either the overhead or the hook pass method. Position of Examinee, Tester and Recorder: the examinee stands just outside the forty feet line in front of the target. The tester stands 5 to 10 feet inside the 40 feet line on the right side of the examinee and the recorder stands on the right side of the target about 5 to 7 feet away from the target wall towards the tester.

Scoring:

For each hitting in the inner rectangle / circle or its line-three points are awarded; for each hitting in the middle rectangle or circle and its line-two points; and for each pass hitting in the outer circle / rectangle and the line-one point is awarded. The total ten trials, score is used for evaluating basketball passing test item of the
battery.

Johnson Basketball Dribble Test:

This test item has been designed with the purpose of measuring ball handling ability and agility level of the examinee. The examinee is required to cover a maximum distance while dribbling around obstacles in 30 seconds. Four obstacles (chairs or hurdles) are arranged in a straight line at six feet apart. The first obstacle is 12 feet away from the starting line which is 6 feet wide. The subject is asked to begin dribbling from one end of the starting line and is required to dribble for 30 seconds in a zigzag manner around the turnings at each obstacle point, approaching the first obstacle on the opposite side of the starting point and by turning about at the fourth obstacle.

Scoring:

The score is equal to the number of zones covered in 30 seconds. The scoring pattern is also illustrated in figure. In short, the examinee gets one point on crossing each obstacle. However, two sides of the last obstacle and the starting line mark provide two separate points as they represent the boundaries of two zones each. The above three Johnson basketball basic skill test items constitute the basketball skill test battery and the three scores added together constitute the Johnson basketball test battery score which may be compared directly among basket baler's score or after converting to 'T' Scores.

Statistical technique:-

The statistical computation of data of the present study is used by using SPSS package in the computer. The result computed also crosschecked by using following statistical variables. Mean standard deviation, F-test. The level of significance will be set-up at 0.05 level of confidence to test the hypothesis.

BIBLOGRAPHY

Abhijeet.S (2013). Effects of selected exercises to achieve health related physical fitness components among sedentary students. *Ph.D thesis*. SRTM Univarcity, Nanded.

Ades, P. A., P. D. Savage, M. E. Cress, M. Brochu, N. M. Lee, and E. T. Poehlman (Aug, 2003). Resistance training on physical performance in disabled older female cardiac patients. *Medicine & Science in Sports & Circuit training*, 35(8):1265-1270. *AIIMS, All India Institute of Medical Sciences.*

Akadémiai K. (March, 2009). Effects of sleep deprivation on cardiorespiratory functions of the runners and volleyball players during rest and exercise. ISSN 0231-*424X 1588-2683* Issue Volume 96, Number 1/ 29-36.

Ali Z. O. (2010). The effects of Pilates exercise on blood pressure and selective physical fitness components in sedentary overweight females. *Br J Sports Med* 2010; 44:i28 doi:10.1136/bjsm.2010.078725.92.

Andrea G. A. (2013). Influence of a Medium-Impact Exercise Program on Health-Related Quality of Life and Cardiorespiratory Fitness in Females with Subclinical Hypothyroidism: *An Open-Label Pilot Study. Volume 2013, Article ID* 592801, 5 *pages http://dx.doi.org/10.1155/2013/592801*.

Andropov R.B, Ramos L, Atallah A.N. (2009). Aerobic exercise training programmes for improving physical and psychosocial health in adults with Down syndrome. *Cochrane Database Syst Rev.*(3):CD005176.

Anna C and Heather A. (2009). Effects of Exercise Interventions on Body Image. *vol. 14 no. 6 780-793.*

Bakke E.F, Hisdal J, Kroese A.J, Jørgensen J.J(2007). Blood pressure response to isometric exercise in patients with peripheral atherosclerotic disease. *Clinical Physiology Function Imaging.* 27(2):109.

Bakke E.F, Hisdal J., SembS.O. (2008). intraocular pressure increases in parallel with systemic blood pressure during isometric exercise. *Invest Ophthalmol Vis Sci. 50(2):760-4. Epub 2008 Oct 3.*

Bennett B. L. (1985). "Cardio-respiratory fitness and cognitive performance before and after confinement in a nuclear submarine. 56(11):1085-91.

Bhosale (2011). Examining the effects of anaerobic exercise on blood pressure among sedentary students. "*Variorum Multi-Disciplinary e-Research Journal* Vol,-02, Issue-II.

Bhosale V (2013). Examining the effects of anaerobic exercise on Heart rate among sedentary students. "*Physical Education Foundation of Indian. ISBN NO.*-978-81-927686-0-1. Page no. 216.

Bhosale V (2014). Examining the Effect of Therapeutic Exercise and Health-Related Fitness Programme on Resting Heart Rate among Young Adults. "*Aayushi International Interdisciplinary Research journal" (AIIRJ), Special Issue on National Sports Day.* Vol– I, ISSN- 2349-638X. Page no.13-18.

Bhosale V (2014). Examining the Effect of Anaerobic Exercises on Respiratory rate among Sedentary Students. "*Variorum Multi-Disciplinary e-Research Journal Vol,-05, Issue-I, ISSN-976-9714*.

Bhosale V. (2013). Examining the effects of anaerobic exercise on Heart rate among sedentary students. "Published in proceeding books of National conference in Physical Education organized by *Pefi* New Delhi *2014*.

Bhosale V. (2013). Examining the effects of anaerobic exercise on Random breathing among sedentary students. "*International journal of academic and Education, 4(1)16.*

Bhosale V.R (2013). Examining the effects of anaerobic exercise on Random breathing among sedentary students. "*International journal of academic and Education, 4(1)4.* Bouclé

Cameron K. A. (August, 1989). "Effects of an Aerobic Movement Programmer on Fitness, Body Composition, and Body Esteem On Over Weight Children" *Completed Research in Health Physical Education Recreation And Dance,* Vol. 31, No. 02, pp. 21-22.

Castejon H, Chiquet C, Savy O, Baguet JP, Khayi H. (2010). Effect of acute increase in blood pressure on intraocular pressure in pigs and humans. *Invest Ophthalmol Vis Sci.*51(3):1599-605.

Chittawatanarat K. (2012). Development of gender and age group specific equations for estimating body weight from anthropometric measurement in Thai adults. *P.65-80.Nt J Gen Med.* 2012;5:65-80..

Research Students **Research Guide**

Sohan Namdev Sonkamble **Dr.Sinku Kumar Singh**